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Cleveland Clinic Abu Dhabi
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PharmaCEries Webinars

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2021 ADA Diabetes Management Updates: Inpatient Setting

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Disclosure Information

- ❑ I have no financial relationship to disclose

  AND

- ❑ I will not discuss off label use and/or investigational use in my presentation

Learning Objectives

- ❑ Identify glycemic targets in hospitalized patients
- ❑ Summarize medication management
- ❑ Review hypoglycemia
- ❑ Discuss transition from the inpatient to outpatient setting

Purpose of a Consensus Report

- Expanding number of glucose-lowering treatments
  - behavioral interventions
  - Medications

- Growing information about their benefits and risks

- Too many options for patients and providers

<u>The Rationale:</u>

To provide an approach that summarizes a large body of recent evidence for practitioners in the U.S. and Europe to facilitate decision making

Considerations on Admission

- High-quality hospital care for diabetes requires standards for care delivery, which are best implemented using structured order sets, and quality assurance for process improvement

- A1C should be measured for all patients with diabetes or hyperglycemia admitted to the hospital if the test has not been performed in the previous 3 months

- Diabetes self-management knowledge and behaviors should be assessed on admission and diabetes self-management education provided, if appropriate

- The National Academy of Medicine recommends CPOE to prevent medication-related errors and to increase efficiency in medication administration

Inpatient Goals for Diabetes Management

- ❑ Prevent hypoglycemia
- ❑ Prevent hyperglycemia
- ❑ Minimize duration of stay
- ❑ Provide effective transition
  - prevent acute complications
  - prevent readmission

Glycemic Targets

Glycemic Targets for Hospitalized Patients

- Insulin therapy should be initiated for treatment of persistent hyperglycemia ≥ 180 mg/dL (10 mmol/L)
- A target glucose range of 140–180 mg/dL (7.8–10 mmol/L) is recommended for the majority of critically ill and noncritically ill patients
- More stringent goals, i.e. 110–140 mg/dL (6.1–7.8 mmol/L), may be appropriate for selected patients if they can be achieved without significant hypoglycemia

Glycemic Targets (cont'd)

- Glucose concentrations between 180 mg/dL and 250 mg/dL (10–13.9 mmol/L) may be acceptable in patients with severe comorbidities
  - inpatient care settings where frequent glucose monitoring or close nursing supervision is not feasible

- Glycemic levels > 250 mg/dL (13.9 mmol/L) may be acceptable in terminally ill patients with short life expectancy
  - less aggressive insulin regimens to minimize glucosuria, dehydration, and electrolyte disturbances are often more appropriate

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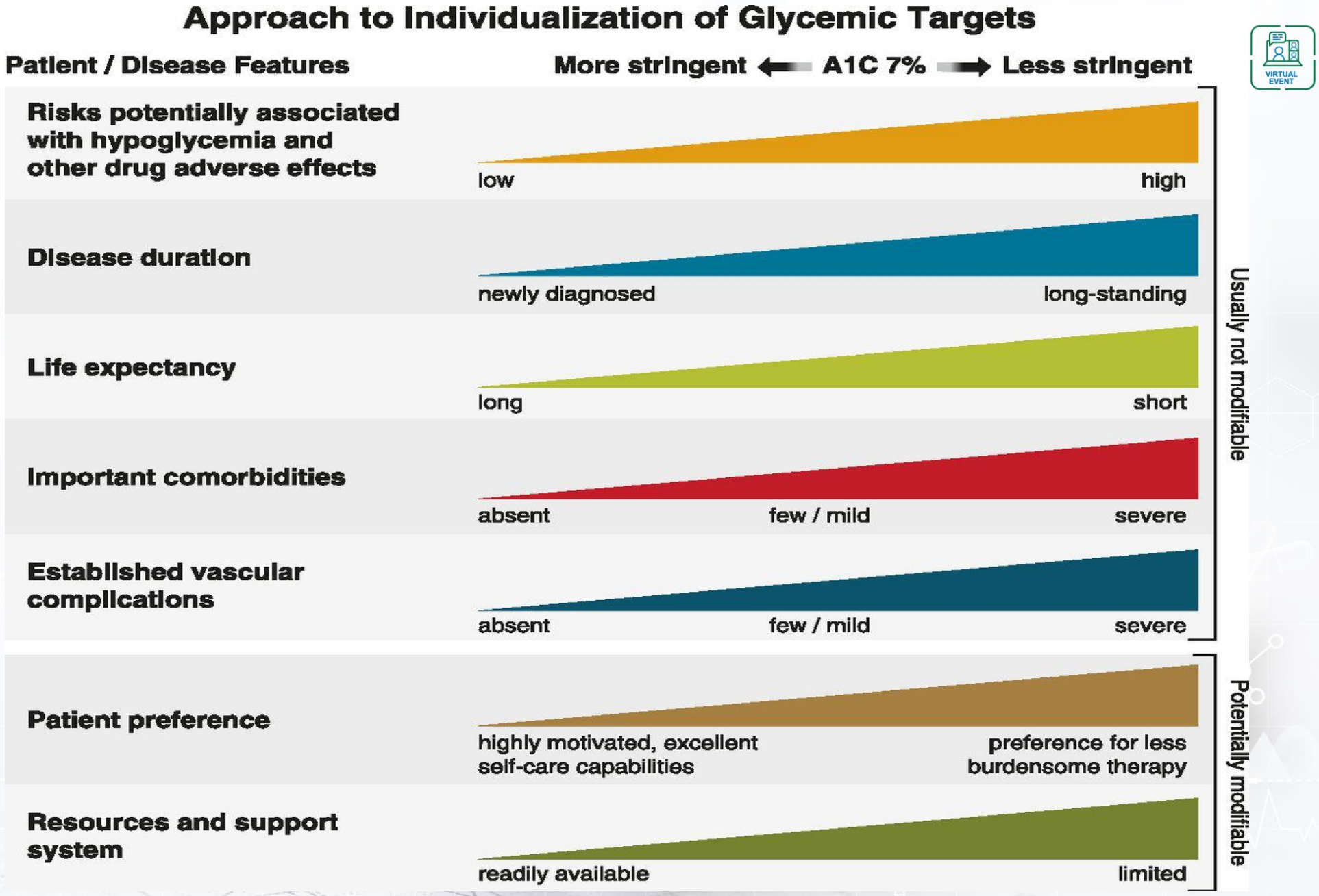
Patient and disease factors used to determine optimal glycemic targets



American Diabetes Association Diabetes Care 2021;44:S73-S84

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Pharmacotherapy in Hospitalized Patients

Insulin Therapy

Critical Care Setting

- Continuous IV insulin infusion is the most effective method for achieving glycemic targets

- IV insulin infusions should be administered based on validated written or computerized protocols that allow for predefined adjustments in the infusion rate, accounting for glycemic fluctuations and insulin dose

Insulin Therapy (cont'd)

Noncritical Care Setting

- Scheduled insulin regimens- basal insulin, or a basal/bolus correction regimen, is the preferred treatment for patients with poor or restricted oral intake
- An insulin regimen with basal, prandial, and correction components is the preferred treatment for patients with good nutritional intake
- The use of SQ rapid- or short-acting insulin before meals, or every 4–6 hours if NPO or if the patient is receiving continuous enteral/parenteral nutrition, is indicated to correct hyperglycemia
- Premixed insulin regimens are not routinely recommended for in-hospital use
- Use of *only* a sliding scale insulin regimen in the inpatient hospital setting is strongly discouraged

Type 1 Diabetes Mellitus (T1DM)

- Dosing insulin based solely on premeal glucose levels does not account for basal insulin requirements or caloric intake, increasing the risk of both hypoglycemia and hyperglycemia

- An insulin regimen with basal and correction components is necessary for all hospitalized patients with T1DM, with the addition of prandial insulin if the patient is eating

- Most importantly, patients with T1DM should always be treated with insulin

Transitioning from IV to SQ Insulin

- A patient with T1DM or T2DM being transitioned to a SQ regimen should receive a dose of SQ basal insulin 2 hours before the IV insulin infusion is discontinued

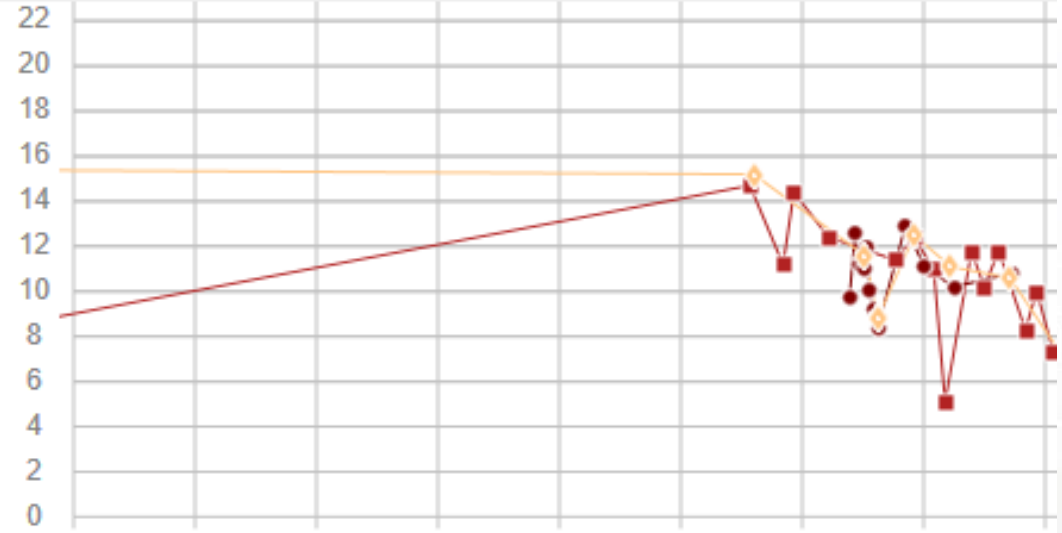
- The dose of basal insulin is best calculated on the basis of the insulin infusion rate during the last 6 hours when stable glycemic goals were achieved

Glucose Management

Go to now | 23/5/2021

No department found | 14 H... | O | 7 HAD

24 hr:	23/05 00:00	24/05 00:00	25/05 00:00	26/05 00:00	27/05 00:00	28/05 00:00	29/05 00:00	30/05 00:00
HBA1C								
Glucose, Whole bl...								



Medication Dosing								
insulin lispro SUBQ (unit)						3.5		
insulin aspart SUBQ (unit)								
insulin NPH human semi-syn S...								
insulin regular, human INJ (unit)							10	
Insulin								
Dose (units/hr) Insulin							5 Un...	4 Un...
Rate Insulin							5 mL...	4 mL...
Volume Infused (mL) Insulin							29mL	39.3mL
Concentration Insulin							1 Un...	1 Un...

Units/hr
4
4
3
3
3
5

Total Insulin over last 6 hrs = 22 units

Oral Antidiabetic Medications

- The safety and efficacy of non-insulin glucose-lowering therapies in the hospital setting remains an area of active research

- Several recent randomized trials have demonstrated the potential effectiveness of GLP1-ra and DPP4i in specific groups of hospitalized patients

- SGLT2 inhibitors are not recommended for routine in-hospital use
  - concern for euglycemic DKA
  - avoid in cases of severe illness, in patients with ketonemia or ketonuria, and during prolonged fasting and surgical procedures

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Hypoglycemia

Classification of Hypoglycemia

Glycemic Criteria/Description	
Level 1	Glucose < 70 mg/dL (3.9 mmol/L) and ≥ 54 mg/dL (3.0 mmol/L)
Level 2	Glucose < 54 mg/dL (3.0 mmol/L)
Level 3	A severe event characterized by altered mental and/or physical status requiring assistance for treatment of hypoglycemia

Agiostratidou et al.

Guideline Recommendations

- A hypoglycemia management protocol should be adopted and implemented by each hospital or hospital system

- Episodes of hypoglycemia in the hospital should be documented in the medical record and tracked

- A patient's treatment regimen should be reviewed and changed as necessary to prevent further hypoglycemia when a blood glucose value of < 70 mg/dL (3.9 mmol/L) is documented

Order Sets

Clear All Orders

Hypoglycemia Treatment Protocol

Personalize

Interventions

Nursing Interventions

- [ ] Notify (Specify)
  STAT, Continuous, Starting 8/6/21, Notify Attending Physician when Hypoglycemia Protocol is initiated.
- [ ] If Blood Glucose Less Than 3.8 mmol/L
  STAT, As needed, (3.4 mmol/L if Pregnant) And Patient is Conscious, Able to Swallow: Give 4oz/118.2 ml of Fruit Juice, Regular Soda or 8 oz/
- [ ] Blood Glucose Monitoring
  STAT, As needed, Starting 8/6/21 Until Specified, 1. When glucose is less than 3.8 mmol/L (less than 3.3 mmol/L if Pregnant) and IF patient is: - Conscious + able to swallow + not NPO = Give 120 mL juice/soda orally or via PEG/NG tube then notify primary physician or designee - UNconscious/unable to swallow/NPO + has IV access= Administer dextrose then notify primary physician or designee - UNconscious/unable to swallow/NPO + DOES NOT have IV access = Administer glucagon then notify primary physician or designee 2. MUST obtain POCT blood glucose within 15 minutes after treatment and as needed until blood glucose is more than 3.8 mmol/L. Once POCT blood glucose is more than 3.8 mmol/L, another level must be checked 30 minutes later.

IV Fluids

IV Fluids

- ( ) dextrose 5 % in water infusion
  Intravenous, As needed, Continuous, as needed for Hypoglycemia treatment
- ( ) dextrose 5% and sodium chloride 0.9% infusion
  Intravenous, As needed, Continuous, as needed for Hypoglycemia treatment
- ( ) dextrose 5 % and sodium chloride 0.45 % infusion
  Intravenous, As needed, Continuous, as needed for Hypoglycemia treatment
- ( ) dextrose 10% in water continuous infusion
  Intravenous, As needed, Continuous, as needed for Hypoglycemia treatment
- ( ) dextrose 20% in water continuous infusion
  Intravenous, As needed, Continuous, as needed for Hypoglycemia treatment

Medications - HYPOglycemia

HYPOglycemia Protocol

HYPOglycemia Protocol Panel

1. When glucose is less than 3.8 mmol/L (less than 3.3 mmol/L if Pregnant) and IF patient is:

- Conscious + able to swallow + not NPO = Give 120 mL juice/soda orally or via PEG/NG tube then notify primary physician or designee

- UNconscious/unable to swallow/NPO + has IV access= Administer dextrose then notify primary physician or designee

- UNconscious/unable to swallow/NPO + DOES NOT have IV access = Administer glucagon then notify primary physician or designee

2. **MUST** obtain POCT blood glucose within 15 minutes after treatment **And** as needed until blood glucose is more than 3.8 mmol/L. Once POCT blood glucose is more than 3.8 mmol/L, another level **must** be checked 30 minutes later.

dextrose 50% in water 50 mL prefilled IV push
25 g, Intravenous, As needed, HYPOglycemia, Starting today at 20:46

Or

glucagon (GLUCAGEN) injection 1 mg
1 mg, Intramuscular, As needed, HYPOglycemia, Starting today at 20:46

Common Causes of Hypoglycemia

- ❑ Insulin dosing errors
- ❑ Inappropriate prescribing of other glucose-lowering medications
- ❑ Inappropriate management of the first episode of hypoglycemia
- ❑ Acute kidney injury
- ❑ Nutrition-insulin mismatch
  - unexpected interruption of nutrition- oral, enteral, or parenteral
  - loss of appetite during admission or emesis

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Transitions of Care

Key Points

- ❑ Transition from the acute care setting presents risks for all patients

- ❑ A structured discharge plan tailored to the individual patient may reduce length of hospital stay, readmission rates, and increase patient satisfaction

- ❑ An outpatient follow-up visit within 1 month of discharge is advised for all patients experiencing hyperglycemia in the hospital
  - If glycemic medications are changed or glucose control is not optimal at discharge, an earlier appointment (1–2 weeks) is preferred

Recommendations

The Agency for Healthcare Research and Quality (AHRQ) recommends that, at a minimum, discharge plans include:

- ❑ Medication reconciliation
- ❑ Structured discharge communication
  - Information on medication changes, pending tests/studies, and follow up needs must be accurately and promptly communicated to outpatient physicians
  - Discharge summaries should be transmitted to the primary care provider
  - Scheduling follow-up appointments prior to discharge increases the likelihood that patients will attend

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Thank you!